Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

ing as it does the wonderful provision made by host plants to entertain and preserve the parasites that infest them.—F. L. HARVEY, Orono, Maine.

EMBRYOLOGY.[1]

Half Embryos versus Whole Embryos.—In a brief contribution to the Anatomische Anzeiger Dr. T. H. Morgan makes an important advance toward the comprehension of the much vexed question as to what may arise from part of an egg, a part or a whole embryo.

Roux claimed that when one of the first two cells of a cleaving frog's egg was killed by a hot needle, the other cell formed only half an embryo. Hertwig, however, in repeating these experiments obtained whole embryos of small size. Then Born showed that when a frog's egg is fixed upside down, the contents rotate and become differently arranged. Finally O. Schultze has shown that if the egg is fixed upside down in the two-celled stage, it will form two embryos, each of half the normal size.

With these facts in mind Morgan repeated the experiments of Roux and Hertwig to see if the contradictory results might not be due to their having overlooked an important factor, namely, the *position* of the cells.

The results obtained are that when most of the 155 eggs were fixed upside down, six half embryos and two whole embryos were reared, eight in all. Of these, the six half embryos came from the few eggs that were fixed in the normal position, that is, with the black part of the egg uppermost. The two perfect, but half sized embryos, came from the large number of eggs fixed upside down, or with the white side uppermost.

In another set of experiments subsequently undertaken, five half embryos were formed from 92 eggs kept in the normal position. In another case from 125 eggs fixed upside down seven whole embryos and three half embryos were obtained.

It seems that in all the eggs tried, half embryos resulted when the egg was fixed in the normal position and one of the first two cells killed. On the other hand, in most cases tried, small whole embryos were formed when the egg was fixed upside down and one of the first two cells killed; in some cases, however, half embryos were formed even under these conditions.

---

[1] Edited by E. A. Andrews, Baltimore, Md., to whom abstracts, reviews and preliminary notes may be sent.

The advance made lies in recognizing that results obtained are not final till all the conditions of the experiment are considered, and that the state of the egg determines the development of half or whole forms irrespective of theories of post-generation or qualitative-division.

The Mouse's Egg.—Dr. J. Sobotta, of Berlin, contributes to the May number of the Archiv für Mikroskopische Anatomie a fully illustrated account of his researches on the fertilization and cleavage of the mouse's egg.

His work has been extended over five years and has involved the death of 750 mice yielding 1459 eggs, only 57 of which were degenerate or not fertilized.

While still warm the ovaries, oviducts and part of the uterus were killed in mixtures of corrosive sublimate and picrosulphuric acid or, to even better advantage, in osmic acid mixtures. The entire organs were cut into serial sections about 10 microns thick, and fixed and stained by special methods given in detail in the paper, to which the reader is referred for a full account of the technique employed.

The author discovered that in the mouse there is besides the period of heat occurring just after parturition, as in many mammals, a second period twenty-one days later. At this time the young are weaned, and by permitting fertilization at this second period only the young are saved for future experiments, whereas they perish if the mother becomes again pregnant at the first period. The ages of the embryos obtained were most accurately determined by reckoning from this second period of heat, at which time the male was admitted.

Ovulation takes place at the first period whether copulation is effected or not. Between the periods of heat copulation is prevented by the fact that the walls of the vagina are grown together.

The process of copulation lasts but one minute and is difficult to observe even in the most tame of the white mice that the author had, as it takes place in the night towards morning, and the animals are then shy. In this process the uterus becomes very greatly distended with sperm containing clusters of sperms and also some isolated sperms, all moving in the liquid. The vagina is distended by a large mass of a homogeneous secretion of the seminal vesicle of the male.

Twenty to thirty hours after copulation the vaginal plug softens and falls out; before this the uterus has become small again and the sperms are dead, as they live but a few hours.

It appears that only a few single sperms enter the oviducts to meet the eggs, since when a sperm was found entering an egg no others could be discovered anywhere near.

When the egg bursts out of a Graafian follicle in the ovary, it is accompanied by a large mass of cells of the discus proligerus that may continue to surround it till after fertilization. It is probable that some of the liquid in the capsule enveloping the ovary and mouth of the oviduct passes into the oviduct with the egg, for the egg is found in a part of the tube distended with liquid.

The egg of the mouse is exceedingly small, only 59 microns in diameter, and is again remarkable amongst Mammalian eggs in having a very thin, flexible zona, only 1½ microns thick.

The polar bodies are exceptionally large, as much as 16 microns through. One is formed while the egg is still in the ovary; it may divide into two, but this was seldom seen. In fact in nine-tenths of the eggs observed only one polar body was formed. Without any other apparent difference some eggs give rise to two and some to one. Since the size and character of the spindle seen in the formation of the single polar body is the same as that seen in the second one when two are formed, it is inferred that most of the eggs omit the formation of the first polar body. In forming the polar body the egg nucleus changes into an achromatic spindle, of probably only 12 threads, lying tangentially near the surface of the egg and bearing probably 12, at the most 14 or 15 rod-shaped chromosomes. There is no sign of radiations in the protoplasm nor of the existence of a centrosome. This spindle then turns into a radial position and the chromosomes divide into two groups of each apparently 12 rounded chromosomes that move toward the ends of the spindle. One group enters the large polar body that is pinched off about it. When there is but one polar body (and is the second if there be two) there are marked thickenings of the achromatic threads to form conspicuous rounded bodies lying in the position of an equatorial plate.

When the polar body is formed the remaining nucleus of the egg forms a dense mass of chromatin about the same size as the male pronucleus. This is formed from the head of a sperm that enters the egg and becomes a spindle-shaped, dense mass lying tangentially near the surface. A centrosome is now seen lying near the male pronucleus. Both pronuclei enlarge and exhibit remarkably large nucleoli or dense spherules of chromatin; there is but one of these in the male while there may be several in the female. Finally all differences between the two nuclei disappear, they lie side by side and each contains a long, much bent strand of chromatin apparently without a free end.

The union of the pronuclei is a summation of separate chromatin bodies that pass from each nucleus to the equator of a spindle; the nuclear membranes disappear and the chromatin breaks up finally into V-shaped loops, apparently 12 in each nucleus ; between the nuclei a centrosome is seen surrounded by sharp radiating lines, while there are also radiations in the protoplasm about the nuclei ; two centrosomes are next found at the ends of a small spindle lying between the two sets of chromatin loops ; these loops then collect at the equator of the spindle that enlarges to form the first cleavage spindle ; these chromatin loops are entirely different in size and form from the chromatin bodies seen in the formation of the polar body and appear to be not more than twenty-four in number.

The first cleavage results in the formation of two entirely equal cells. The nucleus of each receives some of the above chromatin loops; the author supposes they split so that each cell receives 24 chromosomes, but this is not evident from his figures and seems rather an inference from a general idea supported by his belief that the adult tissues of the mouse apparently show 24, and the spermocytes as well as the maturing egg 12 chromosomes.

The subsequent cleavage taking place as the egg passes toward the uterus is at first unequal in that one of the cells enlarges and divides into two; there are then three cells, one large, a pair of smaller. The larger then divides into two smaller than the first formed pair. The first formed then divide so that there are now six ; then the others divide and the egg is made up of eight all essentially alike. The egg has 16 cells about 72 hours and comes into the uterus about 80 hours after coitus.

If the eggs are not fertilized, either from the lack of copulation or from the fact that not enough sperm enters the oviduct to fertilize all the eggs, they degenerate without cleaving.

Interesting cases of polyspermy were seen to result from a second copulation ; if when the vaginal plug is fallen out a second male be admitted, the usual changes in the uterus take place. In one case when the second copulation occurred 18 hours after the first, a sperm was found in an egg having two normal pronuclei, and in another a small pronucleus in addition to the two normal ones. In another case of copulation 24 to 36 hours after the first, where the eggs had divided into two cells, two sperms were found in one cell of one egg and a large nucleus (apparently a male pronucleus) in a cell of another egg, in addition to the normal nucleus of the cell.